Content

Section 9

Uintah Basin Plan

Water Planning and Development

Most developable water has been put to beneficial use. Storage structure improvement and more intensive conservation and management measures will be the major focus of future water planning.

9.1 Introduction

This section describes the major past, present, and proposed water planning and development activities in the Uintah Basin. The current water planning and development in Duchesne and Uintah counties focus on determining the projects that will be included in the final phase of the Central Utah Project. The local water users are also taking advantage of the Colorado River Basin Salinity Control Program in a continuing effort to develop and better use the basin's water resources.

9.2 Background

Utah history is filled with examples of public participation in water resources planning and development. The federal government began its involvement in Utah water development activities in 1865 with the Indians and in the early 20th century with a dam on Strawberry River.

9.2.1 Past Water Planning and Development

Starting in about 1865, the Bureau of Indian Affairs (BIA) promoted irrigation by the Indians. By 1899, 14 canals of various capacities and lengths had been built by the BIA which carried water to small, scattered Indian farms. The Mormons also constructed a mile-long canal as part of their missionary work with the Indians. This canal (Wissup Ditch) was located about 15 miles south of Fort Duchesne below the mouth of the Uinta River.

The Uintah Indian Reservation Allotment Program of 1906 resulted in a convergence of cultures -- non-Indian and Indian -- and made non-Indian settlement possible on almost half of the original two million acres of reservation lands. This development created a complex patchwork of Indian and non-Indian lands served by an intermingled system of canals and ditches.

Lower Ashley Reservoir Site

The Ashley Central Canal, built in 1879, was the first organized effort to construct a group water system in Ashley Valley. The original canal was only 3.5 miles long and had the capacity to irrigate 9,000 acres around Vernal on the west side of Ashley Creek. When the Ashley Central Irrigation Company was incorporated in 1884, the canal was doubled in size, and the company appropriated one-third the flow of Ashley Creek. A system of laterals distributed the water to fields.

The Dry Gulch Irrigation Company was incorporated on December 1, 1905. Its Articles of Incorporation stated the company's purpose was to acquire use of the Uinta, Lake Fork and Duchesne rivers as well as springs and reservoirs for the lands west of the Uinta River, east of Lake Fork Creek and north of the Duchesne River. By December 1905 the company had applied for 850 cfs from Lake Fork, 860 cfs from Duchesne River and 600 cfs from the Uinta River. An application for 50,000 acre-feet of flood water from Lake Fork was also filed.

Storage rights in the High Uinta lakes were secured by the Dry Gulch Irrigation Company and Farnsworth Canal and Reservoir Company. The Farnsworth Canal and Reservoir Company was incorporated in 1908, and its water rights were junior to the Indian and the Dry Gulch Irrigation Company rights. As a result, the company could see the need for storage to ensure an adequate water supply. In 1915 it filed for storage rights for a total of about 5,000 acre-feet in Brown Duck, Kidney, Island and Clement lakes.

The Farmers Irrigation Company applied for storage in several small lakes during the 1910s and 1920s. These lakes in the Swift Creek Basin were Water Lily, Farmers, Deer, East Timothy and White Miller. The company also filed for storage rights in Bluebell, Drift, Superior and Five Points lakes in the Garfield Basin.

Chester Hartman and two neighbors filed for storage in Milk Lake in 1931 and constructed the first grouted masonry dam in the Uinta Mountains. The dam failed in 1940, was repaired and is still being used.

After water short years in the early 1930s, the Bureau of Indian Affairs was forced to impose increasingly strict water delivery conditions. The Bureau of Reclamation was enlisted for assistance and built Moon Lake Reservoir in 1937. The Moon Lake Project takes 23,000 acre-feet of Indian water from the upper Lake Fork River for delivery to stockholders in the Moon Lake Water Users Association in exchange for replacement water from the Duchesne River system into the lower Lake Fork River system by way of the Duchesne Feeder Canal to the Midview Reservoir area.

The Moon Lake Water Users Association controls about 85,320 acre-feet of second priority water rights on Lake Fork, Yellowstone and Uinta rivers. During the 1940s and 1950s, the term "water conservation" was used more and more. To these water users, this term really meant there was an ever-increasing need to store spring snowmelt runoff for irrigation use later in the growing season. As a result, the Moon Lake Water Users Association began acquiring additional high mountain storage rights. By 1963, it held rights in 14 lakes and one major exchange from the Duchesne River of more than 20,000 acre-feet annually.

Many other storage facilities, canals and ditches have been constructed over the years. These include several canals and ditches in the Tabiona-Hanna area, such as the Rhoades, Farm Creek, Jasper Pike and Tabby canals. Those around Duchesne include the Rocky Point, Gray Mountain and Pleasant Valley canals. In the Vernal-Jensen area, irrigation canals include the Highline, Rock Point, Union, Sunshine, Burns Bench, Central, Ashley Upper, Ashley Central, Steinaker, Burton, Island and Dodds. The Ashley Central, Dodds and Steinaker canals serve about 300 acres of farmland. The Vernal Unit was completed in 1962, with the exception of the Stewart Lake drains which were completed in 1981.

Big Sand Wash Reservoir, located north of Upalco, was completed in 1965 and supplies irrigation water to the Roosevelt area and north and south Myton benches. Sheep Creek Irrigation Company built Long Park Reservoir, an off-stream impoundment, in 1979. It is located on the north slope of the Uinta Mountains near Manila. The Sheep Creek Irrigation Company uses water from the reservoir for irrigation of about 11,400 acres, sells 200 acre-feet of water to Manila City, and has an agreement with the Utah Division of Wildlife Resources for a 3,000 acre-foot conservation pool. Two other reservoirs, Meeks Cabin and Stateline, were built as part of the U. S. Bureau of Reclamation's Lyman Project. The water from these reservoirs is exported from Utah and used in Wyoming. The small Greendale Canal diverts water to Greens Lake and the Greendale area. Matt Warner, Calder, Crouse and Browns lakes are managed by the Utah Division of Wildlife Resources for wildlife and fisheries.

Browns Draw Reservoir was built by the Moon Lake Water Users Association and stores about

5,900 acre-feet of irrigation water. A list of existing lakes and reservoirs is shown in Section 6, Table 6-1.

Central Utah Project[122]

The Central Utah Project (CUP) was originally divided into five separate units to facilitate planning and construction. Four of these units -- Vernal, Bonneville, Jensen and Upalco – were authorized for construction in 1956 by the Colorado River Storage Project Act. The Uintah Unit was authorized in 1968 by the Colorado River Basin Project Act.

The Jensen, Vernal, Upalco and Uintah units are situated entirely within the Uintah Basin. The Jensen and Vernal units have been completed and make water available for irrigation of Indian and non-Indian lands and for municipal and industrial use in Uintah County. The Bonneville Unit, nearing completion, involves water collection and distribution in the Uintah and Bonneville basins.

The Central Utah Completion Act directs the CUWCD to plan, design and construct remaining units of the CUP. Non-Indian projects to replace the Upalco and Uintah projects are currently being investigated with the DCWCD and Associated Water Users of the Lake Fork and Uintah rivers.

The Central Utah Water Conservancy District Board includes members who represent the Uintah Basin. Along with the Duchesne County Water Conservancy District, it will sponsor and contract with the United States Government for the repayment of the reimbursable costs of the redesigned Upalco and Uintah units. The Uintah Water Conservancy District has sponsored the Vernal and Jensen units. It is responsible for the sale and delivery of project water and will operate and maintain most of the project facilities.

The following is a brief description of three CUP units.

The **Bonneville Unit** is the largest and most complex of the CUP units. For planning and coordination purposes, it was divided into six systems according to location and function. These systems are: (1) Starvation Collection System, (2) Strawberry Collection System, (3) Ute Indian Tribal Development, (4) Diamond Fork System, (5) Municipal and Industrial System, and (6) Utah Lake Basin Project. All the systems are completed, except for part of the Diamond Fork System and the Utah Lake Basin Project System which is being re-scoped.

The Starvation Collection System was completed in 1970. The Starvation Reservoir stores about 167,300 acre-feet. It provides 22,600 acre-feet of late-season irrigation water for use on approximately 26,000 acres of land along the Duchesne River below Duchesne City. It also provides 500 acre-feet of municipal and industrial (M&I) water for Duchesne City. M&I water is delivered to Duchesne County entities, such as Duchesne City, East Duchesne WID, Johnson WID, Myton City and individuals.

The Strawberry Collection System, completed in the late 1980s, diverts part of the flows of Rock Creek and eight other tributaries of the Duchesne River and conveys the diverted flows through the 36.8 mile-long Strawberry Aqueduct to the enlarged Strawberry Reservoir. The Upper Stillwater and Currant Creek reservoirs serve as regulating reservoirs along the aqueduct. The Soldier Creek Dam increased the capacity of the Strawberry Reservoir from 273,000 to 1,106,500 acre-feet.

The Diamond Fork System facilitates the transbasin diversion of Bonneville Unit water from Strawberry Reservoir to the Bonneville Basin by way of the Diamond Fork and Spanish Fork rivers.

The M&I System provides water to Salt Lake and Wasatch counties and northern Utah County. The main feature is the 314,000 acre-foot Jordanelle Reservoir as well as the Jordan and Alpine aqueducts.

The Utah Lake Basin Project (formerly the Spanish Fork Canyon-Nephi Project) is being re-scoped. The allocation of Bonneville Unit water for the project will be evaluated, and new proposals will be developed.

To compensate the Ute Indian Tribe for anticipated economic losses associated with diminished stream fishing, Bottle Hollow Reservoir was constructed to provide recreation, fishing and wildlife activities.

The **Vernal Unit** furnishes municipal water for the communities of Vernal, Naples, Maeser, Glines and Davies. Completed in 1962, it provides supplemental irrigation water to about 15,000 acres of land in Ashley Valley by storing the high flows of Ashley Creek for late season use. Flows of Ashley

Creek are diverted at the Fort Thornburgh Diversion Dam, through the three mile-long Steinaker Feeder Canal, for storage in Steinaker Reservoir. This off-stream reservoir, four miles north of Vernal, has an active storage capacity of 33,300 acre-feet. Water from the reservoir is distributed through the Steinaker Service Canal. Project lands that previously received a partial water supply from the unregulated flows of Ashley Creek and frequently suffered crop failures are now assured a reliable water supply. Recreation and fishing facilities have been provided at Steinaker Reservoir.

The **Jensen Unit**[94] provides water for Ashley Valley and the area extending east to the Green River. About 18,000 acre-feet of water are available for municipal and industrial purposes in the Ashley Valley area and 4,600 acre-feet to supplement the irrigation supplies for about 4,600 acres of land near Jensen. Red Fleet Reservoir on Big Brush Creek, the Jensen Unit's major feature, has a total capacity of 26,000 acre-feet. The reservoir stores early spring runoff and surplus flows of Big Brush Creek for subsequent municipal, industrial and irrigation use. Recreation, fish, wildlife and flood control benefits are also part of the project.

Municipal and industrial water is lifted from Red Fleet Reservoir by the Tyzack Pumping Plant to Tyzack Aqueduct, which takes it to the Ashley Valley Water Purification Plant that is owned and operated by the CUWCD. Red Fleet Reservoir was planned and constructed during the "boom" days of the oil shale boom. But cheaper oil imports ushered in the "bust" days of the oil shale industry, leaving about 70 percent of Red Fleet water unsubscribed. The Burns Pumping Plant, not yet constructed, will pump water from the Green River for irrigation in the Jensen area. Unit water is also being provided to enhance the Stewart Lake Waterfowl Management Area.

The Central Utah Project, Ultimate Phase, Comprehensive Plan (1951), was to deliver water from Flaming Gorge Reservoir by aqueduct and canal and deliver water to lands near Neola, Bluebell, Upalco, Roosevelt, and as far west as Blue Bench north of Duchesne. Analysis by the BR determined that the Ultimate Phase did not meet the benefit-cost ratio and it was therefore never constructed. Duchesne County believed, however, the original CUP proposal promised water from the Green River to replace water taken from the Upper Duchesne River drainage. On March 12, 1996, the BR transferred to the Division of Water Resources excess water rights in Flaming Gorge Reservoir, part of which were for the Ultimate Phase. This right allowed for 447,500 acre-feet diverted or 158,890 acre-feet depleted. Duchesne County Water Conservancy District, seeing this as an opportunity to obtain water it believed was its, applied to the board for a portion of this right. The district was awarded 47,600 acre-feet of these water rights in January 1999 for M&I and agriculture.

The rest of the right was divided among 25 other applicants. Daggett, Duchesne and Uintah counties received total diversions of 200 acre-feet for M&I and 101,920 acre-feet for agriculture and depletions of 68 acre-feet for M&I and 57,329 acre-feet for agriculture. Table 9-1 shows a summary of Flaming Gorge water right apportionment for these three counties.

Bureau of Reclamation

The Bureau of Reclamation (BR) received funding during the Great Depression and built Moon Lake Reservoir (35,760 acre-feet) in 1937. The project helped control early spring flooding of Lake Fork River and provided storage for late summer irrigation. Strawberry Reservoir was also constructed by the BR in 1906. The reservoir had an active capacity of 270,000 acre-feet and stored spring runoff for diversion to Utah County (Strawberry Valley Project).

Natural Resources Conservation Service (NRCS)

The NRCS has been the major contributor for completing the projects and plans in the basin as follows:

- A watershed work plan for the Dry Fork Watershed Project[8] was prepared in 1970. The project objectives were to provide watershed protection, flood prevention, agricultural water storage, management, municipal and industrial water, and water for recreation and fisheries development. The project was abandoned in 1977 because a special use permit for water

Table 9-1
Summary of Flaming Gorge Water Right Apportionment

Assignee	County	Intended Use	Annual Acre-Feet Diversion	Annual Acre-Feet Depletion
Daggett County	Daggett	M&I	200	68
Duchesne County WCD	Duchesne	Ag	47,600	31,160
Uintah WCD	Uintah	Ag	51,800	24,745
K Ranch Water Company	Uintah	Ag	2,400	1,356
Brent D. Sheffer	Uintah	Ag	120	68
TOTALS			102,120	57,397

storage in the Ashley National Forest was not forthcoming from the federal government.

- A Watershed Protection Plan and Environmental Assessment was prepared for the Martin Lateral Watershed in the Dry Gulch area in 1981. The project covered an area west of Roosevelt. The principal objective was to improve downstream water quality and increase farm income. Land treatment was completed on 2,700 acres of irrigated cropland and pastureland. Work is continuing.

Local Agencies

Moon Lake Water Users Association and Dry Gulch Irrigation Company are major water providers and have used state funding. Smaller providers have also been major beneficiaries of state funding to develop their systems. Table 9-2 displays the projects funded by the state Board of Water Resources.

9.2.2 Current Water Planning and Development

Central Utah Project Completion Act

Major cities in the Bonneville Basin such as Salt Lake City, Provo and Orem will benefit from Central Utah Project completion. The Central Utah Project Completion Act (CUPCA) gave authority to the Central Utah Water Conservancy District (CUWCD) to replace the Bureau of Reclamation as the agency responsible for planning, designing and constructing remaining units of the project. Section 207 (b) of the CUPCA directed the district to prepare a *Water Management Improvement Plan* and submit it to the U. S. Secretary of the Interior. It includes a water conservation goal and an inventory of management improvement measures.

The six stated purposes of Section 207 are to:

- Encourage the conservation and wise use of water.

- Reduce the probability and duration of periods requiring extraordinary curtailment of water use.

- Achieve beneficial reductions in water use and system costs to prevent or eliminate unnecessary depletion of waters to assist in the improvement and maintenance of water quantity, quality, and streamflow conditions necessary to augment water supplies.

- Support fish, wildlife, recreation and other public benefits.

- Make prudent and efficient use of currently available water prior to any importation of Bear River water into Salt Lake County.

- Provide a systematic approach to the accomplishment of these purposes and an objective basis for measuring their achievements.

To carry out these purposes, the following activities are required:

- Water Management Improvement Plan

The CUPCA requires the plan be updated every three years and that it include the following elements:

Water Conservation Goal

The district's goal is 49,660 acre-feet per year. Fifty percent of the goal (25,000 acre-feet per year) must be achieved by 2005 and 100 percent by 2013.

Water Management Improvement Inventory

To be included on the active inventory, each proposed conservation measure must be found to be cost-effective (without significant adverse impact to the financial integrity of the district or a petitioner of project water), environmentally acceptable, in the public interest and has satisfied the requirements of the National Environmental Policy Act of 1969.

Comparative analysis of each cost-effective and environmentally acceptable measure.

Schedule of implementation for the following five years.

Assessment of the performance of previously implemented conservation measures.

- Water Pricing Policy Study

- Coordinate Operations Study of Independent Municipal, Industrial and Irrigation Systems.

- Establish a Utah Water Conservation Advisory Board.

Two projects were authorized under Section 207. They are the Island Ditch Project and the Sunshine Canal Project.

The Uintah Basin Replacement Projects (UBRP) are part of the Central Utah Project Completion Act (CUPCA) adopted by Congress in October 1992. The act's purpose is to complete a series of irrigation improvements planned by the U. S. Bureau of Reclamation (BR) since 1956. The intent of the legislation was to allow local water users, the Uintah and Ouray Indian tribes and the CUWCD to work together to identify and select alternative projects to those identified by the BR that are more economically and technically feasible and more environmentally desirable. However, the Uintah and Ouray Indian Tribes have withdrawn their support of the Uintah and Upalco projects.

The CUPCA requires a study to improve coordination among all water systems in the district's area. It looks at individual and interagency conservation programs and at coordinating projects. Objectives of the study are to:

- Improve the availability and reliability of the water supply.

- Coordinate the timing of reservoir releases under existing water rights to improve instream flows for fisheries, wildlife, recreation and other environmental values, if possible.

- Assist in managing drought emergencies by making more efficient use of facilities.

- Encourage the maintenance of existing wells which would be used for peak water demand.

- Allow for the development, protection and sustainable use of groundwater resources within the district's boundaries.

- Not reduce the benefits that would be generated in the absence of the joint operating procedures.

- Integrate management of surface and groundwater supplies and storage capability.

Table 9-2
Board of Water Resources Projects

Sponsor	Type	Date
DAGGETT COUNTY		
Daggett County Water & Sewer District	CL-SYST	09/09/85
Flaming Gorge Water System	CL-TANK	10/18/77
Manila Town	CL-TANK	04/22/76
Manila Town	CL-WELL	08/24/79
Sheep Creek Irrigation Company	CNL-ENL	12/22/47
Sheep Creek Irrigation Company	CANAL	07/02/60
Sheep Creek Irrigation Company	DAM-RES	12/08/76
Sheep Creek Irrigation Company	CNL-REP	09/12/83
Sheep Creek Irrigation Company	PR-PIPE	10/29/87
Sheep Creek Irrigation Company	SAFEDAM	08/01/94
Sheep Creek Irrigation Company	DAM-REP	09/23/96
DAGGETT COUNTY TOTAL 11		
DUCHESNE COUNTY		
Altamont Town	CL-TANK	06/28/77
Dry Gulch Irrigation Company	CANAL	04/18/51
Dry Gulch Irrigation Company	DAM-REP	09/25/52
Dry Gulch Irrigation Company	SAFEDAM	01/01/95
Dry Gulch Irrigation Company	SPRINKL	11/02/94
Duchesne Cnty Upper Country WID	CL-SYST	08/12/92
East Duchesne Culinary WID	CL-PIPE	05/11/82
East Duchesne Culinary WID	CL-PIPE	08/09/94
Farm Creek Irrigation Company	PR-PIPE	06/26/96
Fruitland WID	CL-SYST	11/30/89
Hidden Valley Irrigation Company	CANAL	01/26/60
Little Farm Creek Canal Company	SPRINKL	05/18/95
Monarch Canal Company	DAM-ENL	10/18/79
Moon Lake Water Users Association	DAM-RES	06/27/63
Moon Lake Water Users Association	DAM-RES	08/15/82
Moon Lake Water Users Association	SAFEDAM	08/01/93
Moon Lake Water Users Association	SAFEDAM	08/01/94
Moon Lake Water Users Association	SAFEDAM	08/01/94
Myton City	CL-TRMT	10/27/76
Neola Water & Sewer District	CL-SYST	11/08/85
Red Creek Irrigation Company	DAM-RES	10/30/59
Red Creek Irrigation Company	SPRINKL	05/26/89
Red Creek Irrigation Company	SAFEDAM	08/01/93
Rhoades Canal Company	PR-PIPE	05/15/93
Roosevelt City	CL-WELL	01/01/76
Roosevelt City	CL-WELL	06/28/84
Roosevelt City	CL-WELL	02/23/90
Tabiona Town	CL-TANK	09/29/76
Uintah Basin Irrigation Company	CANAL	10/17/57
DUCHESNE COUNTY TOTAL 29		
UINTAH COUNTY		
Ashley Central Irrigation Company	DIV-DAM	12/05/83
Ashley Upper Irrigation Company	DIV-DAM	03/09/84
Ashley Valley Reservoir Company	CNL-REP	08/05/81
Ballard Culinary Water Association	CL-PIPE	12/19/59
Burns Bench Irrigation Company	DIV-DAM	09/07/60

Table 9-2 (Continued)
Board of Water Resources Projects

Sponsor	Type	Date
Burns Bench Irrigation Company	PR-PIPE	11/06/61
Dry Gulch Irrigation Company	LH-PIPE	07/26/89
Highline Canal Company	DIV-DAM	01/14/55
Highline Canal Company	CANAL	08/31/79
Maeser WID	CL-WELL	04/27/78
Mosby Irrigation Company	PR-PIPE	11/01/73
Mosby Irrigation Company	LH-PIPE	10/18/77
Ouray Park Irrigation Company	CANAL	07/06/48
Ouray Park Irrigation Company	DAM-RES	08/05/57
Ouray Park Irrigation Company	CNL-ENL	10/25/66
Ouray Park Irrigation Company	DAM-RES	06/09/80
Sunshine Canal Company	PR-PIPE	11/13/92
Tridell-Lapoint WID	CL-TANK	04/27/78
Tridell-Lapoint WID	CL-TRMT	07/30/82
Vernal City	CL-TANK	07/10/86
White River Dam	MISCELL	05/07/82
Whiterocks Irrigation Company	DAM-RES	12/17/85
Whiterocks Irrigation Company	SAFEDAM	05/10/94
Whiterocks Irrigation Company	SAFEDAM	05/10/94
Whiterocks Irrigation Company	SAFEDAM	05/10/94
Whiterocks Irrigation Company	SAFEDAM	07/01/94

UINTAH COUNTY TOTAL 26

GRAND TOTAL 66

CODE	DESCRIPTION	CODE	DESCRIPTION
CL-CLOR	Culinary Chlorinator	DIV-DAM	Diversion Dam
CL-PIPE	" Pipe	DUAL-WS	Lawn & Garden Irrigation
CL-PUMP	" Pump	EQ-WELL	Equip. Well - Irrigation
CL-SPRI	" Spring	IR-PUMP	Irrigation Pump
CL-SYST	" New System	IR-WELL	Irrigation Well
CL-TANK	" Storage Tank	LH-PIPE	Low Head Pipe
CL-TRMT	" Treatment Plant	MISCELL	Miscellaneous
CL-WELL	" Well	PR-PIPE	Pressure - Pipe Irrigation
CANAL	Canal	REG-PON	Regulating Pond - Irrigation
CNL-ENL	Canal Enlargement	SPRINKL	Sprinkle Irrigation System
CNL-LNG	Canal Lining	STOCKWR	Stockwater Facilities
CNL-REP	Canal Repair	TUNNEL	Tunnel
DAM-ENL	Dam Enlargement	TUN-ENL	Tunnel Enlargement
DAM-REP	Dam Repair	TUN-REP	Tunnel Repair
DAM-RES	Dam & Reservoir (New)		

The Upalco and Uintah Units[132,17,18] were to be located in the central part of the Uintah Basin. The works associated with these units are not yet constructed. Several communities lie within the project boundaries including Roosevelt, Fort Duchesne, Altonah, Altamont, Bluebell, Mt. Emmons, Mountain Home, Talmage and Upalco.

The status of the proposed Uintah and Upalco Unit Replacement Projects is as follows:

- The Ute Indian Tribe has withdrawn its support for the projects.

- Smaller, downsized projects are being planned by the DCWCD, local irrigation companies and the CUWCD.

- Alternative projects to the Upalco and Uintah units, if built, will provide storage of early season runoff in project reservoirs to support late season irrigation needs so that basin farmers can bring their lands into cost-effective productivity. The increased supplemental water supply will extend the average growing season from two to three weeks.

- The project water will be developed from surplus flows, mostly spring runoff, of the Lake Fork, Yellowstone and Uinta rivers, all of which originate high on the south slopes of the Uinta Mountains. Additional supplies will come from savings of excessive seepage losses realized from the rehabilitation of existing canals and water saved from the retirement of marginal farmland.

Water Use Simulation Models

The district has helped develop technical models of the CUP and related features that show water users can benefit from coordinated operations. The Division of Water Resources has participated in a BR study of the selenium pollution reaching Stewart Lake. The division has created daily water supply computer simulation models for the Vernal-Jensen, Upalco and Uinta drainages as part of this effort. The water supply, diversions, storage and return flows are computed daily for a 43-year record. Existing and potential reservoirs can be modeled. Utah State University is providing a graphical interface to the model and a water quality model to calculate the quality of the water throughout the area, including the inflow to Stewart Lake.

Colorado River Basin Salinity Control Program[95,106]

The Colorado River Basin Salinity Control Program, a federal/state and local cooperative program, is ongoing in the Uintah Basin. The goal of the program is to reduce the salt-loading in the Colorado River from irrigation return flow and deep percolation. Water quality monitoring and evaluation data from the NRCS show a reduction of more than 92,300 tons per year has occurred in the Uintah Basin since the project started. The projected project total is 111,210 tons per year.

A monitoring and evaluation team has been in place in the Uintah Basin since the beginning of the program in 1990. The program has resulted in improving irrigation efficiency on more than 101,000 acres of land. More than 90,000 acres have converted from flood to sprinkler irrigation, increasing the irrigation efficiency from 56 percent to 84 percent. Another 13,000 acres have improved surface irrigation practices, resulting in an increased efficiency from 56 percent to 66 percent. This has resulted in the reduction of deep percolation of more than 61,000 acre-feet of water per year. These values show that the salinity program has been successful in meeting its goal of improving irrigation efficiency and reducing the salt load from over-irrigation in the Uintah Basin.

Water quality data from USGS shows that the salt load is decreasing in the Duchesne River since the salinity project started.

As part of the ongoing Salinity Control Program, the BR continues to investigate opportunities within the Duchesne River drainage to implement off-farm irrigation system improvements. Through modification of the timing of return flows, these improvements have the effect of reducing salt-loading to the Colorado River. These improvements would be implemented by local water users groups, funded through a competitive grant program administered by the BR.

The BR approved a $9 million grant in 1997 to Duchesne County Water Conservancy District to pipe five canals operated by five different canal companies. The canals that will undergo extensive improvements are the Payne Canal in the upper country north of Altamont, the Sandwash Canal in the Ioka/Upalco area, Uintah Basin Irrigation Company Canal in Pleasant Valley, Red Creek Canal in the Fruitland area, and a Dry Gulch Class "C" Canal in North Myton Bench. The 23-mile canal rehabilitation project will reduce the amount of salt flowing into the Colorado River.

Local Water Projects

The local water users have initiated investigations in projects such as Red Wash Dam, Lower Ashley Creek Dam, Leota Bench Supplemental Irrigation Project, Ashley Creek Stabilization Project, Alta Ditch, Highline and Upper Canal Project. See Figure 9-1 for project locations.

Red Wash Dam

The Uintah Water Conservancy District and Mosby Irrigation Company are sponsoring the Red Wash Dam. It is an off-stream reservoir supplied by a feeder canal from Deep Creek. The storage capacity would be 2,200 acre-feet, with a surface area of 85 acres. The dam would be 100 feet high, and stored water would be used for late season irrigation. The dam is located northeast of Lapoint. The Board of Water Resources has approved funding and some work has been completed.

Lower Ashley Creek Dam

The Lower Ashley Creek Dam is sponsored by the Uintah Water Conservancy District. The proposed reservoir would store winter and drain water from draws east of the reservoir site. Approximately 1,700 acres below the dam would receive supplemental water during late summer. Winter drain water from several draws would be diverted into Lower Ashley Reservoir by a canal to the reservoir site.

Leota Bench Supplemental Irrigation Project

The Leota Bench Project is sponsored by the Uintah Water Conservancy District and would pump water from the Green River to supplement irrigation water in the Leota Bench area. The Utah Board of Water Resources approved 8,400 acre-feet of water rights for the proposed project on August 8, 1996.

The pump station would pump water to the existing distribution system on Leota Bench. Supplemental irrigation water would be provided for 2,040 acres and new water for 670 acres.

Ashley Creek Stabilization Project

The proposed Ashley Creek Stabilization Project would include clearing existing snags and debris, creek bank restoration, installation of gabions, and removal of cobble, sand and debris from canal diversions. A dam on Trout Creek is proposed to reduce peak flows during spring flooding. A long-term goal is to restore Ashley Creek to its original channel in the flood plain.

Alta Ditch, Highline and Upper Canal Project

The project would combine these canals into a pipeline. The project would save water due to a reduction in canal seepage and provide a pressure system for sprinklers. The reduction in seepage would reduce salt loading to Ashley Creek. Funding would be provided by the Central Utah Water Conservancy District and the Bureau of Reclamation.

Red Creek, Sand Wash, Dry Gulch Class C, Pleasant Valley and Payne Canal Project

This project would line these canals and save water due to a reduction in canal seepage. Funding would be provided by the Bureau of Reclamation, Central Utah Water Conservancy District and Duchesne Water Conservancy District.

9.2.3 Environmental Considerations

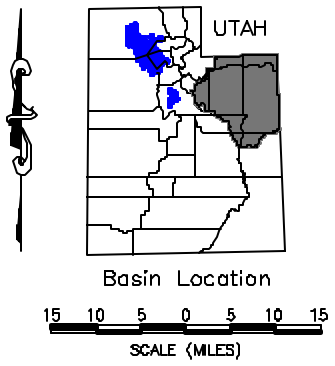
Section 301 of the Central Utah Project Completion Act establishes the Utah Reclamation Mitigation and Conservation Commission to coordinate the implementation of mitigation and conservation provisions. In addition, the commission is to administer the expenditure of funds for the implementation of the fish, wildlife and recreation mitigation, and conservation projects and features authorized in the act.

9.3 Water Resources Problems

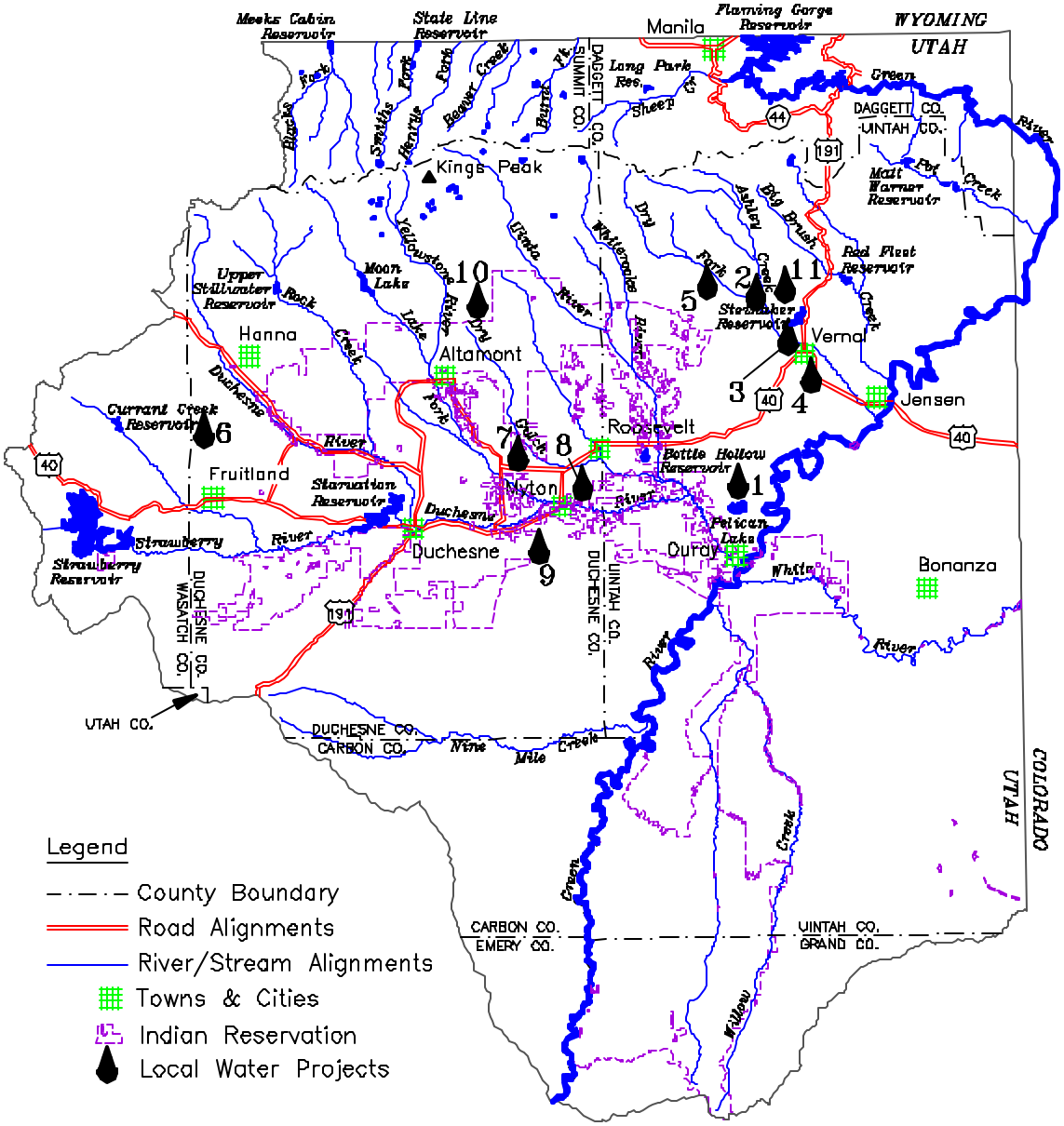
Water resources in the basin are adequate for municipal and industrial uses, but there is a shortage of irrigation water where no reservoir storage is available. The water users on the Yellowstone, Uinta and Whiterocks rivers have a need for late season irrigation water. Most of the spring snowmelt runoff is not stored or useable, due to unavailable reservoir storage.

Figure 9–1

LOCAL WATER PROJECTS
Uintah Basin



1 Leota Bench
2 Ashley Creek Stabilization
3 Highline/Upper Canal
4 Lower Ashley Creek
5 Redwash
6 Red Creek Irrigation
7 Sand Wash Irrigation
8 Dry Gulch Class C
9 Pleasant Valley
10 Payne Canal
11 Tyzach Aqueduct Reach III



Late summer storage is also needed for use south of Highway 40 in Lower Ashley. A lower Ashley Creek reservoir has been proposed to store available winter water and excess spring runoff.

9.4 Water Use and Projected Demands

Water use is divided into municipal and industrial, secondary, agricultural, recreational, and environmental categories.

9.4.1 Municipal and Industrial Water (M&I)[168,57]

Based on the existing use patterns and the population growth projections (Section 4 - Demographics and Economic Future), future water use needs were projected from 1995 to 2050.

Table 9-3 compares the projected M&I water demands of major water suppliers in the Uintah Basin with the projected M&I water supplies. Smaller systems are not included. The Uintah Basin has sufficient water supplies to meet anticipated M&I demands well beyond the year 2050. The water use data were obtained from meetings with all of the community water system managers. These data are summarized in *M&I Water Supply, Use and Rights in the Uintah Basin,* published by the Division of Water Resources.

9.4.2 Secondary Water

Several basin communities have secondary systems for delivering water to lawns, golf courses, gardens and other landscaping.

Water use in these systems is presented in Table 9-4. Secondary use is projected as a percentage of culinary use. Cities such as Roosevelt and Vernal use a secondary system to irrigate their golf courses and large grass areas.

9.4.3 Agricultural Irrigation Water[3,158,156]

Approximately 201,120 acres of land are irrigated in the Uintah Basin. Current diversions of 797,610 acre-feet of water are used for crop production. Table 9-5 shows the projected needs. Section 10 provides additional detail on agricultural water use.

9.4.4 Recreational Demands

Some of the state's most popular, water-based recreation is located in this basin. Strawberry, Currant Creek, Starvation, Upper Stillwater, Steinaker, Red Fleet, State Line and Flaming Gorge reservoirs provide about 100 square miles of reservoir recreation opportunities. Crowding has been a problem at Strawberry Reservoir for many years. Recreational demand for water is expected to be very strong in the future. More detail on this subject is provided in Section 15.

9.4.5 Environmental Needs/Demands

Water is needed for riparian vegetation, wetland maintenance, and instream flows for fish and wildlife. Phreatophytes are deep-rooted plants that obtain water from the water table or the soil just above. They occupy approximately 33,500 acres of wetland associated with irrigated land in this basin. Many of the phreatophyte areas, such as Stewart Lake, Pelican Lake and the Ouray National Waterfowl Refuge are considered valuable for wildlife. They also act as natural filters, removing some nutrients and other pollutants, such as selenium, from the waters that flow through them.

Since the passage of the Federal Endangered Species Act in 1973, four Colorado River fish have been listed as endangered. These are the Colorado pikeminnow, humpback chub, bonytail chub and the razorback sucker. All of these fish presently inhabit parts of the Green River system in Utah and Colorado.

In an effort to protect and nurture the endangered fish and allow continued development of Upper Colorado River Basin water, the Secretary of Interior, the Governors of Wyoming, Colorado and Utah, and the Administrator of the Western Area Power Administration were cosigners of a cooperative agreement. The purpose of the agreement is to implement the Recovery Implementation Program (RIP). The objective of the RIP is to identify and implement Reasonable and Prudent Alternatives (RPA) that will ensure the survival and recovery of the listed species while allowing new water development in the Upper Basin to continue. Many activities are ongoing in the Upper Basin to manage, develop and maintain

habitat, stock native fish, control non-native fish, and collect data and complete research.

The RIP operates on a principle of unanimous consent. Issues are significant and often controversial. One of the difficulties facing the RIP is the fundamental definition of recovery. Agreement has not been reached on what constitutes "recovery" of the fish, which has made clear objectives difficult to articulate. The RIP has, however, yielded a long-term plan. RIP committees agree annually on what can be done to improve conditions for fisheries and organize activities to carry out the objectives.

In the past, diversion of Duchesne River water under the Bonneville Unit has been permitted by the operation of Flaming Gorge Dam as a Reasonable and Prudent Alternative. However, in 1994 the lower 2.5 mile reach of the Duchesne River was designated as critical habitat for the razorback sucker. This action resulted in re-consultation on federal actions in the Duchesne River System. A Biological Opinion has been written for the Duchesne River, and RPAs have been included. The Biological Opinion addresses the continued transbasin diversion of Duchesne River water into the Utah Lake Drainage Basin.

One of the RIP activities recently completed was the *Duchesne River Hydrology and Water Availability Study*. The objectives of the study were to quantify the amount of water currently in the lower Duchesne River, compare this with the preliminary recommended flows determined by the U. S. Fish and Wildlife Service (USFWS), and identify potential sources of water that could be used to augment flows in the lower Duchesne. The USFWS preliminary recommended flows are not based on biological data or habitat needs of the endangered fish. Rather, they represent flows that historically occur in the river as recorded at the Randlett gage.

Other RPAs for the Duchesne River are included in the July 29, 1998 Duchesne River Biological Opinion. It is the responsibility of the RIP to implement the RPAs. Included in these RPAs are a five-year study to obtain biological information about the value and function of the lower Duchesne River for the endangered fish. Once the biological needs have been identified and evaluated, plans will be devised by the RIP to provide conditions for recovery of the endangered fish.

9.5 Alternatives For Meeting Water Needs

Most major water sources in the Uintah Basin will be developed (except the Green and White rivers) if the Central Utah Project, as currently authorized, is completed. However, small projects by local water users to better use or develop existing (local) water rights will continue to be investigated and, when feasible, constructed. Numerous opportunities have been identified by Central Utah Water Conservancy District consultants in a study on ways to coordinate operation of planned and present facilities and systems. Engineering and cost analyses have yet to be completed. Implementing feasible opportunities will provide maximum benefit from the use of the scarce water supply.

9.5.1 Water Supply Management

Several opportunities were identified by the CUPCA-mandated study of coordinating operations [Section 207(d)]to improve management of existing supplies. Contractual arrangements between municipalities and local farmers can be structured to transfer irrigation water to cities during serious drought periods, or cities could purchase water rights and lease unused water back to the farmers. These arrangements would provide municipalities with supplemental water when needed most without having to carry excess water rights that may be rarely needed. Irrigators would be compensated for any profit lost by the arrangement, and participation would be voluntary. Irrigation water used for raising small grains and pasture would more likely be made available than water used to produce alfalfa or other higher valued crops. An approved water right or change application would be required.

The Colorado River Basin Salinity Control Program organized a salinity monitoring and evaluation team (M&E). The objectives of the M&E program are to:

- Monitor and evaluate changes in the salt load entering the Colorado River system.

Table 9-3
Uintah Basin Projected M&I Demand and Supply
(Major Public Suppliers)[a]

Year	1995 Population Projection	Water Demand (Diversions)	Water Demand (Depletions)	Water Supply	Surplus
			(acre-feet/year)		
1995	39,460	12,110	6,050	48,730	36,520
2000	42,510	13,140	6,570	48,730	35,590
2010	48,610	15,020	7,510	48,730	33,710
2020	54,710	16,900	8,450	48,730	31,830
2050	87,020	26,940	13,470	48,730	21,790

[a]Includes residential and commercial total potable use. Includes secondary water use.

Table 9-4
1995 Secondary Water Use and Projected Demand

Year	County			Total Diversion	Total Depletions
	Daggett	Duchesne	Uintah		
		(acre-feet)			
1995	70	1,050	1,380	2,500	1,750
2000	80	1,120	1,490	2,690	1,880
2010	90	1,280	1,710	3,080	2,160
2020	110	1,430	1,920	3,460	2,420
2050	130	1,560	2,220	3,910	2,740

Table 9-5
Irrigation Water Use and Projected Demand

Year	Hydrologic Study Area					Total[a] Demand	Total Depletions
	Upper Green	Ashley/ Brush	Duchesne/ Strawberry	Green	White		
			(acre-feet)				
1995	50,540	82,570	537,100	121,310	6,090	797,610	411,310
2020	50,020	81,450	532,510	120,410	6,090	790,480	407,630
2050	49,390	80,110	527,000	119,330	6,090	781,920	403,220

[a]Agricultural Diversions

- Monitor and evaluate changes in a wildlife habitat as a result of the salinity program.

- Monitor and evaluate the on-farm economic impacts and development information that the operator and field office planning staff can use.

- Monitor only operators who presently are, or previously have been, participants in the Colorado River Salinity Control Program.

Monitoring of 780 irrigated acres of surface and sprinkler systems showed a reduction in salt-loading to the Colorado River System.

Irrigation water "call systems" have been operating by the Dry Gulch and the Lake Fork irrigation companies. Each user has a set water (acre-feet) allotment for the year stored in Big Sand Wash and Moon Lake reservoirs. When the user needs water, they call the ditch rider, and the required amount of water is released into the canal for use by the user. If the user does not use their allotment during the year, the water can be stored and used the next year. Each user does not know his or her set allotment until the end of the irrigation season. The users start the year with an allotment of carry-over storage, plus any winter storage and any credits of natural flow. Project or storage water is credited as it becomes available during the irrigation season. The Uintah Water Conservancy District is currently incorporating the irrigation water call system for the Ashley Valley. Water stored in Steinaker Reservoir, in combination with Ashley Creek flows, will be distributed to the farmers as needed.

9.5.2 Surface Water Storage Facilities

When the Central Utah Project is completed, most large, feasible surface water storage sites, except the White River dam site, will be developed. Upstream storage capacity is increasing the flexibility in the system. Keeping as much water as possible in the upper reservoirs allows these supplies to be released on an "as called for" basis to a broader service area. Lower elevation reservoirs can be used to provide supplemental capacity. Demands would be met from the lowest possible source, thus maximizing the flexibility. An added benefit may be reduced system-wide evaporation losses, since upstream reservoirs are located where there are lower temperatures and less evaporation. These reservoirs are generally deeper and have higher retention efficiencies.

More aggressive operation of reservoirs using real time data (automated call systems) and better modeling of storage systems may increase usable surface water supplies. In some areas, multiple upstream reservoirs feed lower downstream rights. Downstream water demands can be met more efficiently when the multiple reservoirs are operated as a single system to fulfill the downstream demands rather than relying on the specific water rights.

Operation of the multiple reservoirs as a single system improves flexibility. Current examples are the Strawberry/Starvation System and the Cottonwood and Brough reservoirs. Close monitoring and measuring of irrigation water is required.

9.5.3 Cloud Seeding

The Utah Cloud Seeding Program has the goal of increasing winter precipitation within targeted mountain watersheds. Enhanced winter snowpack leads to additional surface stream flow runoff and underground water storage during the spring and summer months.

A cloud-seeding project operated in Daggett, Duchesne and Uintah counties in 1977, 1978 and 1989. Some basin residents believed cloud seeding on the Wasatch Front was reducing the Uintah Basin's precipitation. However, independent studies at Utah and Colorado State universities concluded that an increase of about 15 percent occurs.

9.5.4 Water Education

Numerous programs are available for promoting water conservation. The programs include exchanging new low-flow toilets and shower heads for old ones, secondary irrigation systems, and conservation inducing price structures. These programs are explained in more detail in Section 17, Water Conservation.

The annual Young Artists' Water Education Poster Contest is an event which continues to be the highlight of October, which is Water Education month. Children in kindergarten to 6th grade

participate in this statewide contest each year. Themes chosen each year all relate to water as a resource.

Education provides one of the best approaches to ensuring responsible behavior toward water. Project WET (Water Education for Teachers), through its education services and programs, will help prepare students for citizenship in the next century.

9.6 Issues and Recommendations

Issue addressed: Local water management plans.

9.6.1 Local Water Planning

Issue - Many communities are not adequately planning for future growth.

Discussion - Water purveyors need to plan for their future growth. Community leaders should plan for a combination of water supply, water quality and conservation strategies that will provide an integrated structural and nonstructural program to meet their needs.

Various scenarios can be explored to consider all the options available to the communities. Least-cost analysis may be used, with water conservation and environmental impacts given full consideration. Groundwater sources will be considered along with conversion of agricultural water and water conservation through better efficiencies within and outside the community's homes.

The plan should be reappraised periodically. By updating population projections, reevaluating water source quality and capacities, and incorporating new conservation methods as they become available, people responsible for water delivery will be alerted to problems that are beyond their term of office and yet require timely action for the future quality of life.

Recommendation - Most communities and/or water utilities should prepare a long-term water management plan which includes new water supply sources and water conservation programs. The plans should be reviewed and updated periodically. To encourage management and conservation planning, water funding agencies should require plans as a condition of state cost-sharing. ❑